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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/589,867	08/18/2006	Srikanth Venkatachari	3502-1109	3778

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EXAMINER	
STIMPERT, PHILIP EARL	
ART UNIT	PAPER NUMBER
3746	

NOTIFICATION DATE	DELIVERY MODE
06/14/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

DocketingDept@young-thompson.com

Office Action Summary	Application No.	Applicant(s)	
	10/589,867	VENKATACHARI ET AL.	
	Examiner	Art Unit	
	PHILIP STIMPERT	3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 August 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,7-13,16,17 and 20-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7-13,16,17 and 20-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 August 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 24 August 2010 has been entered.

Status of the Claims

2. The Examiner acknowledges receipt of Applicant's amendments, arguments and remarks contained in the submission noted above. Per Applicant's response, Claims 1-5, 7-13, 16, 17, 20-27 are pending in the instant application. Claims 1 and 13 have been amended. Claims 6, 14, 15, 18 and 19 are cancelled. All other claims remain in their previously presented form. The Examiner has carefully considered all of Applicant's arguments and remarks, and they will be addressed below.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 3-5, 7-13, 16, 17, and 20-27 rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,481,973 to Struthers (Struthers hereafter) in view of US Patent 4,945,491 to Rishel (Rishel).

5. Regarding claim 1, Struthers teaches (see Fig. 1) a pump station (10) which transfers liquid from a tank (84) and is controlled by an electric drive including a frequency converter (30). Struthers teaches that several pumps may be operated, and may be alternated in operation to wear evenly (col. 6, ln. 29-41). Struthers further teaches measuring the level of the liquid with a sensor (70) and controlling the activation of the pump based on the measured level (col. 5, ln. 44-49) and selecting a first level (full tank). Struthers teaches monitoring the moment at which the tank reaches the first value from a predetermined direction and controlling the pump to start its operation in order to move the level in the opposite direction. Struthers also teaches detecting (see 124) a second moment when the liquid surface level reaches another value of the liquid surface level (at which the pump can no longer usefully function, see col. 7, ln. 51-54) and stopping the pump at that time (125). Further, this is accomplished by means of a controller which includes a microprocessor (24) and an inverter (30, or frequency converter). The method steps are therefore considered to be performed in the frequency converter (30). Struthers does not specifically teach selecting a first rotation speed at which the amount of transferred fluid relative to consumed energy is greatest, instead teaching only a "standard speed" (col. 7, ln. 41). Rishel teaches (see Fig. 1 generally) a monitor and control system for a pump installation. In particular, Rishel teaches selecting a pump operating condition with

maximum efficiency (W in the equation at the top of col. 7). This efficiency is dimensionless, but the scaling factor (K) which removes the dimensions is measured in foot- gallons per minute per kilowatt, which indicates that the efficiency is directly related to the amount of transferred liquid relative to the energy consumed. It is well known in the art that improving the efficiency of a system can reduce the energy require and thereby the cost. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to select as a first operation speed, i.e. the standard speed, of the pump of Struthers a speed of maximum efficiency in order to minimize energy used and thus reduce costs.

6. Regarding claim 3, Struthers teaches that the tank (84) is emptied by the pumps, and that therefore the predetermined direction is from the bottom toward the top.

7. Regarding claim 4, Struthers teaches selecting separate first and second values of the liquid and running the pumps at different speeds accordingly (col. 5, ln. 63 through col. 6, ln. 7). In particular, Struthers teaches allowing a higher speed when the liquid level is higher, which one of ordinary skill would appreciate would allow the system to prevent overflow of the tank.

8. Regarding claim 5, Struthers teaches that the second speed value is a maximum rotation speed (col. 6, ln. 4, "higher maximum speed").

9. Regarding claim 7, Struthers teaches that a second pump may be operated to increase flow rates (same citation), and that an alarm level of overfill may be reached (112). In such an overfill situation, with a multiple pump installation, it would be obvious

to one of ordinary skill in the art that the maximum pumping capability would be required, thus the second or further pumps would be activated at such a condition.

10. Regarding claim 8, Struthers teaches that the predetermined surface level is substantially stored in the frequency converter, inasmuch as the indication from the level sensor (70) which initiates the pump operation is evaluated in the controller (24) and converter (30). Therefore, at least a binary representation of the tank state indicated by the sensor must be stored or inherently formed in the circuit architecture. Further, Rishel teaches storing flowrate setpoints (Q1, col. 7, ln. 52-55) which one of ordinary skill in the art would appreciate are essentially proportional, and in a VSD type system analogous, to the rotation speed setting.

11. Regarding claim 9, evaluation of the signal from the level sensor (70) is performed by the frequency converter, or controller, and thus the level is measured therein.

12. Regarding claim 10, Struthers teaches providing an alarm signal (col. 7, ln. 30-31, at step 112), and teaches that the pump is controlled on the basis of that signal (col. 8, ln. 64). Struthers also teaches that the control board (22) of each pump may send alarm signals when appropriate, and can operate on the basis thereof, for instance to shut down the pump (col. 8, ln. 62 through col. 9, ln. 12).

13. Regarding claim 11, Struthers teaches that an alarm function (112) is performed when the liquid surface level exceeds a selected alarm limit value.

14. Regarding claim 12, Struthers teaches running the pump in reverse to suspend solids in the tank (col. 7, ln. 1-23). As this creates a vortex, it will tend to vary the

surface level of the liquid, and while the pump is running in reverse, any liquid entering the tank will change the liquid level (hence the need for an updated liquid level in lines 22-23). This would have the effect of reducing deposition of solids on the bottom of the tank and at any particular fixed surface level on the sides of the tank.

15. Regarding claim 13, Struthers teaches a frequency converter (24, 30) and a pump station (10) with a liquid tank (84), pump (54) and electric drive (12). Struthers teaches that the frequency converter (30) and associated controller (22, 24) comprise means for storing a first value of the liquid level (col. 3, ln. 53-56, memory device, liquid level storage indicated by 104 and 112 in Fig. 5A), means for storing a first value of the rotation speed of the pump (same memory device, speed storage indicated by col. 5, ln. 12-17), means (22, 24) for measuring the liquid level on the basis of a signal received from a sensor (70), means for detecting the moment the liquid surface level reaches the first value (104) from a predetermined direction and means for controlling the rotation speed of the pump (col. 5, ln. 12-17) to the first value of the rotation speed in response to the moment detection in order to run the pump and thereby move the level in the opposite direction. Struthers also teaches means (22, 24) for detecting (see 124) a second moment when the liquid surface level reaches another value of the liquid surface level (at which the pump can no longer usefully function, see col. 7, ln. 51-54) and stopping the pump at that time (125). According to the combination above (refer to pages 3 and 4 of office action), the first speed is substantially the most efficient as taught by Rishel and as claimed. Finally, Struthers teaches that several pumps may be operated, and may be alternated in operation to wear evenly (col. 6, ln. 29-41), by

control means similar to the central controller (60) of Rishel which would transmit control data to the frequency converters (30) of the pumps of Struthers.

16. Regarding claim 16, Struthers teaches selecting separate first and second values of the liquid and running the pump at different speeds accordingly (col. 5, ln. 63 through col. 6, ln. 7). In particular, Struthers teaches allowing a higher speed when the liquid level is higher, which one of ordinary skill would appreciate would allow the system to prevent overflow of the tank. The controller (22, 24) and associated frequency converter (30) provide the means to accomplish this.

17. Regarding claim 17, Struthers teaches that the second speed value is a maximum rotation speed (col. 6, ln. 4, "higher maximum speed").

18. Regarding claim 20, Struthers teaches that the frequency converter comprises means (36) for transmitting surface level data to the frequency converter of a second pump (76).

19. Regarding claim 21, Struthers teaches a memory unit (col. 3, ln. 53-61, memory device) for storage of the surface level and speed, as well as a program for controlling the drive.

20. Regarding claim 22, Struthers teaches a measurement unit (22) for receiving a signal from the level sensor (70) and determining the surface level (104, 112) on the basis of the signal.

21. Regarding claim 23, Struthers teaches a terminal (71) for connecting the level sensor (70).

22. Regarding claim 24, Struthers teaches a processor (24) for controlling the electric drive on the basis of a program (as above) that controls the processor.

23. Regarding claim 25, Struthers teaches means (22, 24) for receiving an alarm signal (as in 112) and for controlling the pump on the basis of that signal (as in 112).

24. Regarding claim 26, Struthers teaches means for performing an alarm function (112) if the liquid surface level exceeds an alarm level (col. 7, ln. 29-30).

25. Regarding claim 27, Struthers teaches that the frequency converter comprises software for measurement of the liquid level on the basis of a signal from the sensor and control of the rotation speed of the pump based thereon (102, 104, 118).

26. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Struthers in view of Rishel as applied to claim 1 above, and further in view of US Patent 2,462,076 to Dryden (Dryden).

27. Struthers in combination with Rishel teaches the inventions of claim 1 as detailed above. However, Struthers and Rishel both relate to pumping systems which are designed to empty a tank, rather than to fill it. Dryden teaches a system in which a pump is utilized to maintain liquid level in “a container from which fluid is drawn either continuously or periodically," (col. 1, ln. 3-4). The benefits of Struthers as modified by Rishel, such as efficiency, remote control, and reliability, could as easily be obtained by applying their teachings to a system such as Dryden, in order to create an efficient and reliable system of that type. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the control apparatus and methods of

Struthers and Rishel could be used in an apparatus such as that of Dryden, in which a tank is filled by a pump. One of ordinary skill would appreciate that the predetermined direction would be from the top to the bottom in such a system.

Response to Arguments

28. Applicant's arguments and amendments, see page 15, filed 24 August 2010, with respect to indefiniteness have been fully considered and are persuasive. The rejection of claim of 12 has been withdrawn.

29. Applicant's remaining arguments have been fully considered but they are not persuasive.

30. With respect to the argument that Rishel does not teach the claimed speed, the examiner disagrees. Generally, while Rishel indicates that those of ordinary skill in the art are concerned with the problem of optimizing the efficiency of a multiple pump system. In particular, with respect to applicant's assertion that the pumps of Rishel are fixed speed, the examiner notes that Rishel also considers applications involving variable speed systems (see for instance col. 3, ln. 54-56). Choosing the speed at which volume moved per energy consumed is merely optimization to be expected of those of ordinary skill in the art, and is clearly suggested by the efficiency optimization taught by Rishel. Essentially, one of ordinary skill in the art would be motivated to optimize the "standard speed" taught by Struthers according to the considerations taught by Rishel. While Rishel teaches varying the pump speed, this is done for a generically described output condition such as a desired flow rate or pressure. Since

the relevant portion of the control process of the system of Struthers is directed solely to emptying the tank, rather than, for instance, maintaining a particular rate of flow in doing so, it would be obvious purely for the sake of simplicity to leave the "standard value" as a constant system parameter as is taught by Struthers.

31. With respect to the arguments regarding the amendments to the independent claims, the examiner disagrees that they distinguish over Struthers. In particular, Struthers teaches running the pump from a first time (tank full, 104), at which a tank full level has been reached. One of ordinary skill in the art will realize that, since the tank has been in the process of being filled, the liquid level will be rising until it reaches the tank full level. At that point, Struthers teaches running the pump so as to lower the liquid level (118), until the tank is emptied (124), at which the pump is deactivated (125). This method falls within the scope of claims 1 and 13.

32. In light of the foregoing, the rejection is maintained.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PHILIP STIMPERT whose telephone number is (571)270-1890. The examiner can normally be reached on Mon-Fri 7:30AM-4:00PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571) 272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/William Rodriguez/
Primary Examiner, Art Unit 3741

/P. S./
Examiner, Art Unit 3746
6 June 2011